City of Fort Collins Utilities

Front Range Smart Grid Cities

Abstract

The City of Fort Collins' Front Range Smart Grid Development project involves the municipal utilities for the cities of Fort Collins and Fountain, Colorado. The project includes citywide deployment of advanced metering infrastructure (AMI); expansion of distribution automation capabilities including supervisory control and data acquisition (SCADA) system connected fault indicators; SCADA-connected remote operated feeder switches; incorporation of meter "last-gasp" signals into the outage management system; demand response products; evaluation and potential implementation of time-based rate programs including time-of-use and critical peak pricing; customer education; and Web portal access. Information from this project facilitates: (1) customer-participants' ability to view their energy consumption through in-home displays, a Web portal, or both; and (2) the ability of City of Fort Collins and the City of Fountain to manage, measure, and verify targeted demand reductions during peak periods. The new AMI and distribution automation technologies help improve service quality and reliability by enabling more efficient outage management, distribution circuit monitoring, and remote circuit switching.

Smart Grid Features

Communications infrastructure includes a new digital point-to-multi-point radio network from each substation and other points throughout the cities to meters and distribution automation devices, and enhancements to an existing fiber-optic backhaul network from the substations to the utility operations center. This infrastructure provides the cities of Fort Collins and Fountain with expanded communication capabilities to better understand and integrate customer information, energy delivery system operations, and distribution system reliability information.

Advanced metering infrastructure includes the deployment of about 84,290 advanced meters throughout the entirety of the cities of Fort Collins and Fountain as well as supporting information technologies and data management infrastructure. This system provides automated meter reading, improved long-term meter accuracy, enhanced outage detection, power quality monitoring,

At-A-Glance

Recipient: City of Fort Collins Utilities

State: Colorado

NERC Region: Western Electricity Coordinating Council

Total Budget: $36,202,526

Federal Share: $18,101,263

Partners: City of Fountain, Colorado

Project Type: Advanced Metering Infrastructure
Customer Systems
Electric Distribution Systems

Equipment

- **84,290 Smart Meters**
- **Advanced Metering Infrastructure Communication System**
  - **Meter Communications Network**
  - **Backhaul Communications**
- **Meter Data Management System**
- **Customer Web Portal Access for 84,290 Customers**
- **In-Home Displays/Energy Management Systems**[a]
- **Programmable Communicating Thermostats**[a]
- **Direct Load Control Devices**[a]
- **Distribution System Automation/Upgrade for at least 4 out of 221 Distribution Circuits**
  - **Automated Distribution Circuit Switches**

a. Offered as customer option.

Time-based Rate Programs[b]

- **Time of Use**
- **Critical Peak Pricing**

b. Currently under City Council review.

Key Targeted Benefits

- **Reduced Operating and Maintenance Costs**
- **Increased Electricity Service Reliability and Power Quality**
- **Deferred Investment in Distribution Capacity Expansion**
- **Reduced Costs from Equipment Failures and Distribution Line losses**
- **Reduced Greenhouse Gas Emissions**

City of Fort Collins Utilities *(continued)*

improved meter tampering detection, and remote connect/ disconnect capabilities. A new meter data management system provides expanded capabilities to analyze, interpret, and query meter readings and interval power consumption information, which improves billing and electricity management efforts and load forecasting abilities.

Advanced electricity service options offered through the project encompass the development of a portfolio of solutions to help reduce demand and energy consumption. The portfolio is anticipated to include equipment such as programmable communicating thermostats, in-home displays, Web portal access, and direct load-control devices that control water heaters and air conditioning equipment in homes and businesses. Customers in the cities of Fort Collins and Fountain who choose to enroll in the demand response programs may receive programmable communicating thermostats, load control switches, and have access to a Web portal that provides information on their electricity use.

Time-based rate programs under consideration include an inclining block rate, seasonal tiers, time-of-use pricing, and a time-of-use rate with critical peak pricing. These pricing options are designed to encourage customers to reduce and/or shift their consumption from on-peak to off-peak periods, with the expectation that it also reduces overall peak demand, greenhouse gas emissions, and costs of using power plant peaking generation units during times of peak system demand.

Distribution automation systems include an outage management system, automated switches, feeder power quality and fault monitoring equipment, and remote fault indicators integrated with the outage management system on select distribution circuits. These investments reduce the duration of service interruptions and field operations requirements. Thus, system reliability and power quality are targeted benefits of this upgrade. Having the capability to monitor for rapid, small fluctuations in grid voltage and current supports future implementation of distribution automation that can allow for increased penetration of distributed generation installed on or near residential and commercial buildings.

Timeline

Key Milestones	Target Dates
AMI deployment begins	Q1 2012
Customer systems deployment begins	Q1 2012
Distribution automation deployment begins	Q1 2012
AMI deployment completed	Q2 2013
Customer systems deployment completed	Q2 2014
Distribution automation completed	Q4 2014

Contact Information

Dennis Summer
Senior Electrical Engineer, SGIG Project Manager
City of Fort Collins Utilities
Light & Power
dsummer@fcgov.com

Recipient Team Website: www. fcgov.com